CLAIMS

I claim:

1) An electrical power transmission system where the primary electrical conductors are comprised of one or more electrically conductive sealed tubes which are designed to conduct electrical energy in the tube walls and also to physically transport in quantity a useful medium within the said conductive sealed tubes along the path of the transmission line.

2) An overhead electrical power transmission system where the vertical supporting structural elements of the said system are comprised wholly or partly of towers which also support wind turbine electrical generating machines and the said wind turbines are of a type selected from the set of horizontal axis wind turbine; vertical axis wind turbine.

3) An overhead electrical power transmission system as in claim 1 or 2 having the path of the conductors between tension supports follow a catenary curve or arc with the bow of the curve or arc being as near as possible in the direction opposite the direction of the local prevailing wind.

4) An overhead electrical power transmission system as in claim 1 or 2 which incorporates at some or all of its v rtical supporting structur s a means of efficiently converting the potential energy of a chemical or other potential energy medium which may be supplied at pressure from the said tube of claim 1 or from storage in or near the said vertical supporting structures or from local sources; into electrical energy which is then

immediately delivered to the primary electrical conductors of the transmission system; or

transmitted along the path of the transmission line by secondary transmission conductors to one or more central stations for delivery to the primary conductors; or

supplied to a local distribution system for immediate use;

and the potential energy transfer medium is selected from the set of hydrogen gas; natural gas; methane; producer gas; water gas; vanadium oxide solution; compressed air.

5) An overhead electrical power transmission system as in claim 1 or 2 which incorporates at some or all of its vertical supporting structures a means of efficiently converting electrical energy which may be provided by

wind generators mounted on the vertical supports of the structures; or

electrical generators; fuel cells or batteries incorporated in or near the vertical supports of the structures; or

connections to the system's primary conductors; or

fossil fueled, wind or other nearby local generating systems;

into a chemical or other potential energy medium which may be supplied at pressure into the said tube of claim 1 or stored in or near the said vertical supporting structures; and the potential energy transfer medium is selected from the set of hydrogen gas; vanadium oxide solution; compressed air.

6) An overhead electrical power transmission system as in claim 4 where the means of converting the chemical or other potential energy of the said energy transfer medium into electrical energy is selected from the set of Proton Exchange Membrane fuel cell; Solid Oxide fuel cell; Alkaline fuel cell; Molten Carbonate fuel cell; Brayton cycle engine and generator; Stirling cycle engine and generator; Rankine cycle boiler, engine and generator; Diesel cycle engine and generator; Otto cycle engine and generator; Wankel cycle engine and generator; Vanadium Redox Battery cell; compressed air expander.

7) An ov rhead electrical power transmission system as in claim 5 where the potential energy transfer medium is hydrogen, natural gas or air which is stored at pressure in a storage tank within or near the vertical supporting structural elements of the said system and compressor means are provided to selectively move the gas

from the said conductor tubes into the said storage tank; or

from the said storage tank into the said conductor tubes;or

from the a first point on the said conductor tubes into a second downstream point on the said conductor tubes; and

the compressor means is capabl of being used at times of peak electrical load on the primary conductor tubes to cool the conductor tubes by extracting the gas at pressure from the lines or from storage, compressing it to a much higher pressure than that of the conductor tubes, cooling the resulting over-compressed gas in one or more air cooled heat exchangers, then supplying or returning the overcompressed gas to the said conductor tube through a nozzle which is directed toward the direction of flow, the subsequent high velocity expansion of the compressed gas resulting in a transfer of kinetic energy to the flow and a significant cooling of the stream within the said conductor tubes and therefore the tubes themselves, so providing a means to increase the electrical carrying capacity of the said conductor tubes or to manage the thermal expansion and therefore the sag of the said conductor tubes between vertical supports.

8) An overhead electrical power transmission system as in claim 5 where the potential energy transfer medium flowing within the conductor tubes may at intervals be heated by controlled direct application of a hot gas stream to the exterior of the tube or to a portion of the flow withdrawn from the tube and then returned; to the purpose of reducing or eliminating the buildup of ice or snow on the conductor tubes in adverse weather conditions.

9) An overhead lectrical power transmission system as in claim 5 wh re the conductor tubes or the potential energy transfer medium flowing within the conductor tubes may be heated by one or more high resistance insulated conductors installed within or in thermal contact of the said tube and an endpoint control is connected to the said insulated conductor at each end of the transmission line capable of occasionally selectively routing part or all of the transmitted electrical current onto the said insulated conductors causing them to uniformly provide heat to the said main conductor tubes; to the purpose of reducing or eliminating the buildup of ice or snow on the main conductor tubes in adverse weather conditions.

10) An overhead DC electrical power transmission system as in claim 1 where the conductors may be heated by inserting a high amperage alternating current onto the main conductors or a parallel set of electrically isolated auxiliary conductors through a set of capacitors at the inserted end and a shorting capacitor at the load end, causing the said conductors to uniformly provide heat to the said main conductors; to the purpose of reducing or eliminating the buildup of ice or snow on the main conductors in adverse weather conditions.

11) An overhead electrical power transmission system as in claim 4 where a conductiv or fiber optic communication cable system is installed between each vertical support means, and each vertical support means is provided with bi-directional communication means onto the said communication cable system and a unique address within the network so formed, enabling remote monitoring and command and control of the systems installed at each said vertical support means.

12) An overhead electrical power transmission system as in claim 3 where the permanent means of clamping a tube at a point of tension strain consists of 2 parts; first a placeable clamp means having a system of bolts or other fasteners to fix it to the exterior circumference of the said tube, having means to connect to the tension holding insulaters, and having an enlarged interior circumference for the part of the clamp means nearest the tension holding insulator means and; second an insertable expandable ring system capable of being inserted inside the said tube to a point matching the enlarged circumference of the clamp means from an open end of the said tube, and then forcibly permanently expanded, so forcing the tube walls to enlarge within the said clamp means and therefore to retain the said tube within the said clamp means in tension without reducing significantly the internal section area of the said tube.

13) An overhead electrical power transmission system as in claim 3 where the temporary means of clamping a tube to pull the tub to sag at a point of tension strain consists of 4 parts; first 2 placeable clamp means each having a system of clips or other quick fasteners to fix them to the exterior circumference of the said tube, each having means to connect either to the tension pulling system of jacks or cables, or to the fixed structure of the vertical support means, and each having an enlarged interior circumference which tapers from the end of the clamp means nearest the tension pulling means at the larger circumference toward the end of the clamp toward the span at the lesser circumference and; second two insertable tapered wedge rings designed to clamp tightly by friction to the said tube when inserted into the space between the said tapered placeable clamp means and the said tube without collapsing the said tube when tension is applied.

14) An electrical power transmission system as in claim 1 where the ability of the conductive tube to withstand the pressure of the medium transported within the tubular conductor is reinforced by the circumferential application of tightly wound strands of a reinforcing material selected from the list of glass fiber; aramid fiber; carbon fiber; steel; titanium; steel alloy.